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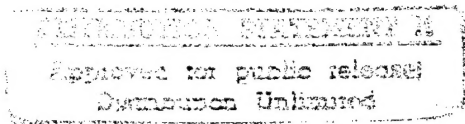
**Japanese Submarine Operational Errors in World War II:  
Will America's SSNs Make the Same Mistakes?**


by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Operations Department.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.




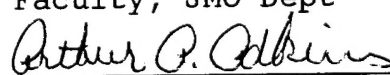
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## **ABSTRACT**

A detailed review of the Japanese Submarine Force before and during World War II reveals a remarkable similarity with America's contemporary fleet of nuclear fast attack submarines (SSNs). As U.S. operational leadership struggles to resolve many of today's submarine command, control, and force utilization issues, they can look to the lessons of the Imperial Japanese Navy. In failing to adequately address submarine operational control structure, in assigning submarines to missions for which they were neither designed nor practiced, and in failing to perceive the importance of emerging technologies, Japanese leadership condemned their underseas force to devastating losses with little to show for a substantial national investment. This paper reviews the inadequacies of the Imperial Navy's operational design and reveals how America may be poised to repeat Japan's dismal submarine wartime performance.

## I. INTRODUCTION

At first glance the gap between the 1941 Japanese submarine force and the American attack submarines of present day appears immense. Exploiting all that modern engineering can offer, the United States has incorporated nuclear power, precision guided munitions, sleek hulls, and computer based sensors into its boats. Today's American nuclear attack submarine, the SSN, is a technological marvel vastly superior to its Japanese ancestor. Still, the two submarine forces exhibit many striking parallels. Both were designed to protect the global interests of island nations critically dependent on imported raw materials. Numerically among the largest submarine fleets of their day, both were manned by elite, hand-picked, superbly trained crews. Possessing state-of-the-art equipment, both forces had the ability to deliver some of the finest weapons of their era anywhere in the world. Most importantly, both forces practiced remarkably analogous command and control and were expected to excel in many of the same mission areas.

The similarities between the World War II Japanese submarine force and contemporary American attack submarines should give today's operational commander reason for pause and concern. Japan expended a great deal of national treasure developing its underseas force but received little for its investment. Like Japan, the United States has also staked a substantial portion of its defense budget and infrastructure on its submarines. Yet, America's SSNs are struggling to define their mission, an

adequate command and control arrangement, and their place in the 'Forward...from the Sea' Navy. U.S. attack submarines may be poised to repeat the mistakes of their Japanese forerunners.

## **II. Japanese Submarine Operations in World War II: A History**

When the Japanese attacked Pearl Harbor in 1941, their submarine employment strategy had been in place for almost two decades. Dissatisfied with the 5:5:3 (American:British:Japanese) capital ship ratio established by the 1921-1922 Washington Naval Conference, Japan looked to its submarines as a force multiplier. Expecting any forthcoming naval war to be a series of major engagements between battleships and aircraft carriers, the Japanese planned to use long range submarines as a means to attrite advancing U.S. fleets.<sup>1</sup> With high hopes for his underseas force Rear Admiral Shigeru Fukudome, Chief of Staff of the Combined Fleet, spoke for many when he wrote:

It was my belief that, even if the Task's Force's aerial attack [on Pearl Harbor] ended in failure, the Submarine Force's operation would not fail. My belief was based on the expectation that no hitch would arise in the submarines' operations.<sup>2</sup>

As foreseen by pre-war planners, the first eight months of the war provided Japan's submarine force with a chance to excel. Pearl Harbor, Coral Sea, and Midway were major engagements between main battle fleets. Japan, on the offensive in each of these battles, had reasonable opportunity to position her submarines against American forces advancing along known threat axes. The performance of the submarines was, however, far below expectations. At Pearl Harbor Japanese submarines (using

aircraft carried on the back of the boats) performed reasonably well in their secondary role of reconnaissance, but sank no enemy shipping.<sup>3</sup> During the Battle of Coral Sea the Japanese fared no better. Despite adequate positioning by some of the newest Japanese boats, no enemy shipping was attacked and superb chances to report American carrier positions were missed.<sup>4</sup>

The Japanese planned massive submarine involvement for the assault on Midway Island. Of approximately 60 units in the submarine inventory, 19 were sortied to Midway in support of the Combined Fleet, while an additional six were sent to the Aleutians as part of a northern feint.<sup>5</sup> Once again, results were disappointing. Although the American aircraft carrier *USS Yorktown* was sunk by the Japanese submarine *I-168*, the forward submarine screen failed to execute its primary function of intercept, warning, and attrition.<sup>6</sup> Despite the substantial number of Japanese submarines in the vicinity of Midway, none was able to locate the American carriers prior to the main fleet engagement. In fact, inadequate submarine reconnaissance was a principal reason the Combined Fleet was surprised by the U.S. Task Force. Moreover, the only reason the *I-168* was able to attack *Yorktown* was that the carrier was dead in the water, the victim of a previous air bombardment.<sup>7</sup>

Long before the Midway debacle, Japanese submariners realized that their performance had been unacceptable. The Sixth (Submarine) Fleet Commander, Vice Admiral Mitsumi Shimizu, reported after Pearl Harbor:

We have ascertained that it is very difficult for submarines to attack warships and block a well guarded harbor. We are of the opinion that the main targets of submarines should be merchant ships and not warships.<sup>8</sup>

Thus, in April 1942 the Sixth Fleet issued a new operational priority. Japanese submarines were to concentrate their efforts on attacking merchant shipping.<sup>9</sup> Oddly, while Combined Fleet Headquarters acquiesced to the shift in Sixth Fleet's priorities, Imperial hierarchy still felt that the submarines' basic mission was sinking combatants. Japanese naval planners fashioned future operations, such as Midway, accordingly.<sup>10</sup>

During the later half of 1942 Japanese submarines not involved with Combined Fleet assaults concentrated their efforts in the Indian and Southwest Pacific Oceans. Following Sixth Fleet's directives, they attacked enemy shipping and achieved some measure of success. Sinking more than 100 merchants, the submarines were playing to their inherent strengths.<sup>11</sup> Unfortunately for the Japanese, the performance of its submarine force had reached its pinnacle.

By November 1942 the Japanese defense of Guadalcanal was desperate. Unable to supply its garrison, the Army concluded that the only way to get ammunition and food to its troops was by submarine. Asserting its influence over the Navy, all available boats were diverted to Rabaul for supply operations. Suffering tremendous casualties in this new stage of the war, submarine crews were disgusted by duty for which they had neither proper training nor equipment. Compounding the loss of men and ships,

most submarines participating in conveyance missions were diverted from formerly successful anti-shipping operations in the Indian Ocean.<sup>12</sup> Supply operations marked the beginning of the end for the Japanese submarine force. With most of its units prevented from conducting offensive operations and losses of experienced manpower in the Guadalcanal supply effort mounting, Imperial Navy submarines ceased to be a serious threat by early 1943.<sup>13</sup>

### **III. Japanese Submarine Operations in World War II: An Analysis**

By most accounts, Japanese submarine performance in World War II was dismal. Japan's underseas fleet sank a mere fraction of American totals (184 merchantmen, 15 warships for Japan; 1,079 merchantmen, 201 warships for the United States) despite rough numerical equivalence with the United States. Even more damning was the fact that the Japanese torpedo at the **start** of the war was far better than any weapon the Americans **ever** possessed.<sup>14</sup> As Admiral Fukudome remarked:

The Japanese Navy expected much from its submarines...But when it came to the test of actual warfare, the results were deplorable.<sup>15</sup>

Why did the Japanese submarine force perform so poorly? A review of the operational design of the Imperial Navy reveals many of the answers.

The Japanese lacked an adequate operational control (OPCON) scheme for their submarines. The Sixth Fleet Commander held OPCON of all submarine squadrons and divisions as a default condition. But when a major offensive was planned, OPCON could



take many forms. For the Pearl Harbor attack Sixth Fleet retained OPCON until the aerial bombardment commenced, then control shifted to the Task Force Commander. At Midway the Combined Fleet Commander held OPCON throughout all stages of the battle, including preparatory reconnaissance. The Imperial Army gained OPCON when submarines began supply transport duty during the struggle for Guadalcanal.<sup>16</sup>

Usually a submariner, the Sixth Fleet Commander nominally understood the strengths and limitations of his boats. Not surprisingly, most success occurred under his OPCON. When another commander took control, problems quickly developed. For example, the Combined Fleet Commander's submarine specialist for the Midway invasion advised him that many of the boats intended for the mission were in unacceptable material condition. Ignoring this warning, the Combined Fleet Commander ordered the boats to assume forward reconnaissance positions. When many of the submarines could not complete the journey to the Central Pacific, an unobstructed passage was left for the American fleet to traverse. As fate would have it, the hole in the Japanese submarine surveillance screen was exploited by the American carriers as they cruised unmolested to Midway.<sup>17</sup>

Another problem with Japanese OPCON was substitution of micromanagement for commander's intent. The inclination of Japan's admirals was to centralize operational and tactical control of the boats. Instead of assigning large patrol areas in which to conduct unrestricted submarine warfare (as was the

practice in Germany and the United States) individual unit captains were given precise locations and inflexible tasking. To make matters worse, operational commanders frequently positioned their submarines like pieces on a game board. Often the speed the boats were ordered to make by shore directive could only be achieved by traveling on the surface. Many submarines were lost during these ill-advised transits.<sup>18</sup> Japan's admiralty was so enamored with micromanagement that they also allowed themselves to be dragged into prescribing tactics. In one particularly stunning instance, the officer holding OPCON was expected to dictate the number of torpedoes that were to be expended on a given target.<sup>19</sup> Japan's ad hoc OPCON systems and smothering leadership produced disastrous results. Unit Commanding Officers (COs) obediently followed orders but rarely demonstrated initiative, cunning, or daring. Paucity of operational intent, combined with timid COs, rendered the entire submarine force impotent.

Another glaring problem for the Japanese submarine force during World War II was lack of operational focus. Specifically, operational commanders frequently tasked boats with missions for which neither the crews had been trained nor the boats designed. The most dramatic example of this problem was the use of submarines for supply missions. Although the Navy strongly opposed the concept of submarines as supply ships, desperate Army generals persuaded Imperial leadership to go forward with the idea. Japanese submarines successfully destroying merchant

shipping in the Indian Ocean were recalled, torpedo tubes were removed, weapons were offloaded, and cumbersome external transport devices were attached. Angered by the Army's interference, the Navy made minimal effort to address critical shiphandling issues or mission safety. Defenseless and often wallowing on the surface attempting to deliver insignificant quantities of food and munitions, Japanese submarines suffered devastating losses executing these poorly conceived ventures.<sup>20</sup>

Supply delivery was not the only example of poor Japanese mission selection. Commanders frequently ordered submarines completing patrols to stop near allied bases and attempt shore bombardment. Equipped with small caliber deck guns and lacking rapid topside reload capability, the boats found themselves outgunned and under attack by the very installations they were supposed to destroy. Instead of letting the submarines conduct missions for which they were designed (offensive mining, for example) Japanese leadership continually assigned shore bombardment as a means to interrupt harbor operations.<sup>21</sup>

Communications were an additional deficiency that plagued the Japanese submarine fleet. Using decoded enemy tasking messages, U.S. convoys bypassed known submarine patrols. By taking advantage of precise Japanese station keeping, American anti-submarine warfare (ASW) assets also frequently turned knowledge of Japanese submarine positions into kills. For example, in 1944 U.S. intelligence determined that ten Japanese submarines had formed a screen in the Philippine Sea. Armed with

this information, three U.S. destroyers systematically dissected the screen and sank six boats. The other submarines in the group managed to reposition and escape, but only after they intercepted American messages intended for Hawaii. Strangely, the surviving boats were never warned by Sixth Fleet Headquarters.<sup>22</sup>

A final indictment of Japanese submarine operations lies in leadership's total disregard for technological developments. By 1943 most American vessels were fitted with effective radar sets. Yet, the Japanese did not install them on their boats until late 1944, despite impassioned pleas from submarine COs.<sup>23</sup> Chief among the reasons the Sixth and Combined Fleets hesitated to force the Naval Technical Department to install available radars was fear of expending political capital on a device of questionable utility.<sup>24</sup> As numerous nighttime ambushes on Japanese boats attest, the Fleet Commanders' priorities and vision were fatally flawed.

#### **IV. Contemporary American Attack Submarine Operations versus the Japanese War Experience: A Comparison**

Few U.S. Commanders-in-Chief (CINCs) have submarine experience and none has ever had a Joint Task Force opposed by a credible submarine threat.<sup>25</sup> Since today's leaders face many of the same submarine operational dilemmas that confronted the admiralty of the Imperial Japanese Navy, a comparison of present day American attack submarine operations with those of the Japanese in World War II provides valuable insight.

A significant issue a CINC must resolve early in any major

regional contingency is OPCON of submarine assets. Prior to the end of the Cold War the Fleet Commander merely delegated OPCON to the Type Commander or a submarine Task Force Commander. In this simplistic but effective system, a submariner always had OPCON of SSNs. However, after the U.S. military drawdown of the early 1990's, several changes were undertaken by submarine leadership to make SSNs more palatable to Carrier Battle Group (CVBG) Commanders. One initiative was to shift OPCON of assigned SSNs to the battle group.

A CVBG commander possessing submarine OPCON is confronted by a significant problem that the Japanese grappled with a half century ago. Unless the SSN exposes an antenna, neither the submarine nor the battle group possess organic means with which to reliably communicate with each other. Indeed, the physics of underwater electromagnetic propagation have not changed since World War II. Only very low radio frequencies transmitted from large shore based antenna arrays have the capability to transmit signals that can be received by submerged SSNs. Therefore, the principal obstacle to uncomplicated OPCON -- communications -- remains a major problem.<sup>26</sup> Since the CVBG Commander can't immediately talk with his submarines and only knows the SSNs' approximate position, he can't instantly direct their actions. He must rely on previously transmitted intent!

Like the Japanese Task Force Commanders before him, the CVBG Commander will be tempted to solve his SSN connectivity deficiencies. Should he choose to remedy the situation with

additional communications requirements (i.e. more antenna time), the CVBG commander places the SSN at risk to radio geolocation or visual counterdetection. The major strength of the SSN -- stealth -- is sacrificed. Moreover, extensive transmissions from emerging high baud systems (such as video data links) significantly increase the probability of enemy decryption. When one transmitted periscope picture contains as much digital information as a month's worth of conventional satellite communications, the opportunity for the enemy to piece together the American operational security puzzle is significantly enhanced.<sup>27</sup> Should an ASW capable enemy even partially decrypt a submarine tasking message, a disaster similar to that suffered by the Japanese in 1944 in the Philippine Sea could occur.

A CVBG Commander not inclined to solve his submarine OPCON problem with increased communications might be enticed to micromanage his submarine's position and speed. When Japanese commanders did this, submarine performance suffered. Japanese COs reluctant to shift from an ordered position let many attack opportunities slip away. Furthermore, the boats were frequently placed at risk when Task Force Commanders forced them to transit at unreasonable speeds, often on the surface. In today's tough ASW environment, where a few knots of speed is the difference between being an effective or useless acoustic sensor, the CVGB Commander could hazard his SSNs by essentially rendering them deaf. Additionally, the CVBG Commander is likely to find, as the Japanese did, that precise station keeping robs submarine COs of

the initiative they need to be effective.

When the U.S. submarine force was threatened by cutbacks, submarine leadership endeavored to ensure SSN participation in every possible military operation. 'Count me in!' became the Silent Service's motto. Emphasis shifted from deep water to the littorals. Instead of opposing Soviet ballistic missile submarines (SSBNs) in the Arctic, SSNs actively participated in a wide range of CVBG operations. Long overlooked missions, such as swimmer delivery and strike, became priorities. Even the pace of budget enhancing V.I.P. tours and media sessions markedly increased. Operational focus was lost.

The Japanese experience indicates that CINCs should be concerned with the number of missions they expect their SSNs to accomplish. Consider the case of ASW. Modern SSNs and diesels can be detected at ranges of only a few thousand yards, if at all.<sup>28</sup> As illustrated by the recent collisions of U.S. and Russian submarines in the Barents Sea, tracking of opposing underseas forces is getting more difficult.<sup>29</sup> Yet, today's CINCs need assurance that their fast sealift ships will not fall victim to a Russian AKULA II class SSN or Iranian KILO class SS interdicting a critical sea line of communication. The difficulty of the contemporary ASW problem and the Japanese submarine experiences after 1942 suggest that as long as U.S. SSN efforts are directed across a wide spectrum of missions, CINCs may not receive the anticipated level of performance in critical areas such as ASW.

Japanese submariners thought they would fight World War II in deep, unrestricted seas. Their boats were designed for open ocean and that is where they trained. By 1945, though, most of the underwater war had been fought where operational leadership had sent the boats -- the littoral. U.S. submariners confront a similar fate in 1996. Despite the fact that their ships were built as deep water, sea control platforms, the Navy's 'Forward...from the Sea' doctrine thrusts them into the world's shallow waters.<sup>30</sup> While U.S. SSNs have exhibited superior peacetime adaptation to this new environment, Japan's ordeals indicate that war could yield entirely different results. Take, for instance, the situation with mines. In the deep waters of the world mines are difficult to employ effectively. On the other hand, mine warfare in the littorals is easy and cheap. Had one of the Iraqi floating mines that seriously damaged *USS Princeton* or *USS Tripoli* in the Persian Gulf War struck a submerged SSN, it is questionable as to whether the submarine could have survived.<sup>31</sup> In fact, U.S. SSNs not only have limited capability to endure a mine explosion, they have practically no chance of finding most modern mines.<sup>32</sup>

Swimmer delivery is another littoral mission that may produce unpleasant wartime surprises. As older SSN classes are decommissioned, the Los Angeles class will be tasked as a drydeck shelter (DDS) host submarine. Already notoriously poor at shallow, slow speed depth control, a Los Angeles class SSN fitted with the bulky DDS could easily find itself broached in



unfriendly waters.<sup>33</sup> Whereas in peace an exposed submarine is threatened by little more than embarrassment, a DDS equipped SSN wallowing on the surface in a war zone may find that it is just as easy a target for coastal patrols as the large, unwieldy Japanese supply submarines were.

The Japanese Submarine Force paid dearly for its leadership's lack of technological vision. While radar was revolutionizing submarine warfare, the Sixth Fleet Staff comfortably claimed that radar sets were 'useless'.<sup>34</sup> Today's CINCs must not let the U.S. Submarine Force make the same mistake. Let us again examine the case of ASW. While America's primary ASW sensor -- acoustics -- yields ever diminishing returns, other nations have looked elsewhere for answers to the underwater detection and tracking problem. Non-acoustic ASW sensors are prominent on several of the latest British and Russian boats. Corresponding devices are nowhere to be found on U.S. SSNs.<sup>35</sup> One can only wonder why the world's other top submarine fleets find these apparatus desirable. Similarly, the U.S. Navy relies solely on acoustics for torpedo homing, despite known deficiencies in shallow water and anti-surface warfare (ASUW) applications. Other nations, such as Russia and Iran, use wake homing technology as a remedy for ASUW acoustic shortcomings.<sup>36</sup> Although the United States has the world's finest deep water, heavyweight torpedo, America does not employ wake homing technology.<sup>37</sup>

## **V. Recommendations**

There are those that believe there is no task more service unique than operating a submarine at war. The lessons of Japanese submarine OPCON clearly lend credence to that opinion. Whenever a non-submariner directed Japanese boats, disaster quickly followed. Not surprisingly, every other nation that has conducted a successful underseas war (including the British in the Falklands<sup>38</sup>) has had a submariner retaining OPCON of attack submarines. American leadership would do well to consider the lessons of others and keep submarine OPCON where it has traditionally been -- in the hands of submariners.

An SSN is a distinctive warfighting machine with missions only it can accomplish. No other armed service or equipment can conduct under-ice ASW, covert mining, or swimmer delivery. Additionally, few would argue that SSNs are the principal ASW platform of the United States. While any number of ships can launch Tomahawk missiles, only an SSN can track down a rogue Russian SSBN in the Arctic or covertly mine Bandar Abbas, Iran. With **submarine unique** capabilities valuable force multipliers, CINCs should carefully consider the ramifications of lost proficiency due to lack of focus in critical mission areas. CINCs should ensure that the Submarine Force remains adequately focused on the tasks which it does best or only it can do.

U.S. SSN wartime missions in shallow, restricted waters are another area in which CINCs should proceed carefully. The poor mine detection and slow speed handling characteristics of the Los Angeles class SSN will certainly exact a heavy price in littoral

warfare if not corrected. The Japanese provided a valuable illustration in underseas littoral warfare. When they lost sight of what their submarines could and could not do, they paid a severe price. With the possibility of less than 50 SSNs in the U.S. submarine inventory, America can't afford the same mistake. If operational leadership truly wants the SSNs to fight in the littorals, then they should make sure U.S. boats are designed to fight and survive there.

Drawdowns are difficult times for military leaders. Research and development, particularly in a mission area where there seems to be minimal threat, is often hard to justify. But throughout today's world submarines are prolific and popular. Money is being invested in submarine warfare and new technologies are emerging. If CINCs want to ensure their boats are a match for any opponent, new ASW and torpedo technologies must be explored and developed. We must not ignore or discard the radar of our generation!

## **VI. Conclusion**

The U.S. Submarine Force has a long and proud tradition. In both World War II and the Cold War it served America superbly. As it struggles to find its place in a world which is no longer bi-polar, the U.S. Submarine Force must rely on the nation's operational leadership to ensure costly mistakes of history are not repeated. The similarities between the Imperial Navy's submarines and contemporary U.S. SSNs, combined with the sobering nature of Japan's operational failure, compel present day CINCs

to heed history's lessons. As patrols off both American coasts by Russian Akula class SSNs in 1995 remind us, other nations would be delighted to possess the world's premier submarine force should the United States **choose** to relinquish the title.<sup>39</sup> With one eye on where others have been, the time has come for today's operational leadership to carefully assess where the U.S. attack Submarine Force is headed.

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